

Environmental Sampling Report – December 22, 2003 Release
Honeywell Plant, Metropolis, Illinois

Illinois Emergency Management Agency, Bureau of Environmental Safety, maintains five low-volume air samplers around the Honeywell plant in Metropolis, Illinois. Station 02 is directly across US-45 approximately 0.25 mile from the plant; station 01 is located at the Metropolis Municipal Airport, approximately 1 mile NNE of the plant. The locations of all the samplers are shown in the attached map.

On 22 December 2003, IEMA staff members retrieved the five air samples started on 16 December. In addition they collected three soil samples and four vegetation samples. The air samples were analyzed for gross alpha activity as usual. Soil and vegetation samples were analyzed by gamma spectroscopy.

Gamma spectroscopy results from the soil and vegetation samples were unremarkable. Gross alpha results of the air samples are shown below. In Table 1 these individual results are compared with the maximum and median values for the 2001-2002 period. Figure 1 shows the 22 December gross alpha results compared to the maximum, minimum, 75th, 50th and 25th percentile values from the two-year period 2001 – 2001. Note that December 22 *gross alpha values at stations 01 and 02 are not shown to scale.*

At Station 02, the station nearest the plant, the average gross alpha concentration from 16 December to 22 December was 833 fCi/m³. As given by 10CFR20 Appendix B, the annual effluent concentration for natural uranium is 3×10^{-12} μ Ci/ml (3000 fCi/m³). The concentration at Station 02 was well below the effluent concentration limit.

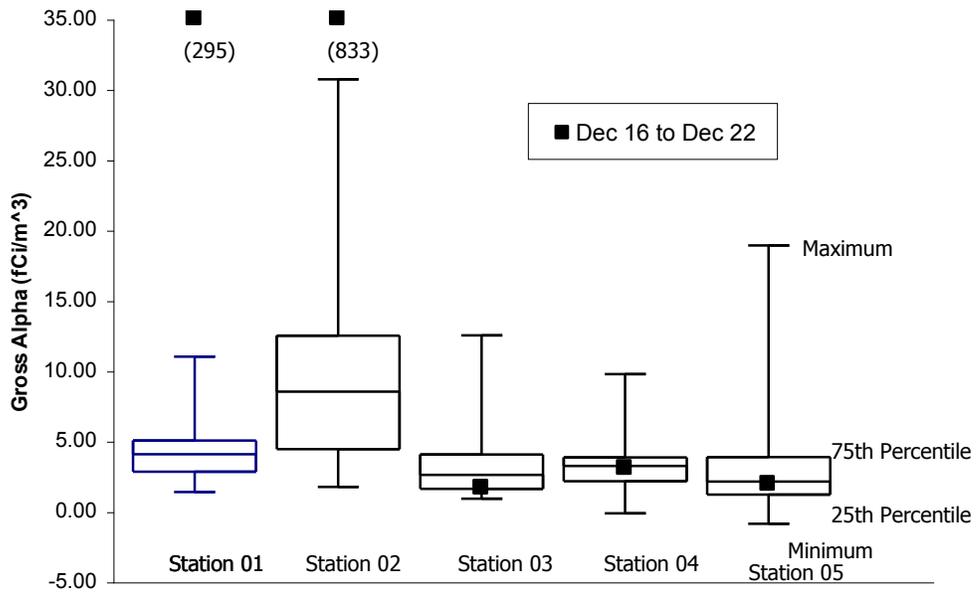
In order to estimate the uranium concentration during the release, it is necessary to know the length of time that the uranium concentration was elevated. Lacking further information, we have assumed that concentrations at Station 02 were elevated for 1 hour. Assume that the sample at Station 02 was exposed to the median concentration of 8.5 fCi/m³ for 139 hours and an unknown concentration, C, for 1 hour. For the average of the 140 hours to be 833 fCi/m³ then, $C = 1.2 \times 10^5$ fCi/m³. As given by 10CFR20 Appendix B, the maximum permissible concentration for continuous occupational exposure for class D uranium compounds (e.g. UF₆ or UO₂F₂) is 5×10^{-10} μ Ci/ml (5×10^5 fCi/m³).

These values are intended as estimates of the magnitude of the release only. While they are appropriate for confirming plume models, the data should not be used in lieu of an actual source term. Developing a plume model would require a measure of the total amount of uranium released, a value that IEMA does not have.

Table 1: Gross Alpha Concentrations, 16 Dec 03 to 22 Dec 03

Station	Gross Alpha (fCi/m ³)	95% CI	01-02 Median	01-02 Maximum
01	295	8.7	4.1	11.0
02	833	14.5	8.5	30.7
03	1.7	1.1	2.6	12.5
04	3.1	1.3	3.2	9.8
05	1.9	1.1	2.1	18.9

Figure 1: Gross Alpha Distributions by Station



Attachment 1: Locations of IEMA Air Sampling Stations

